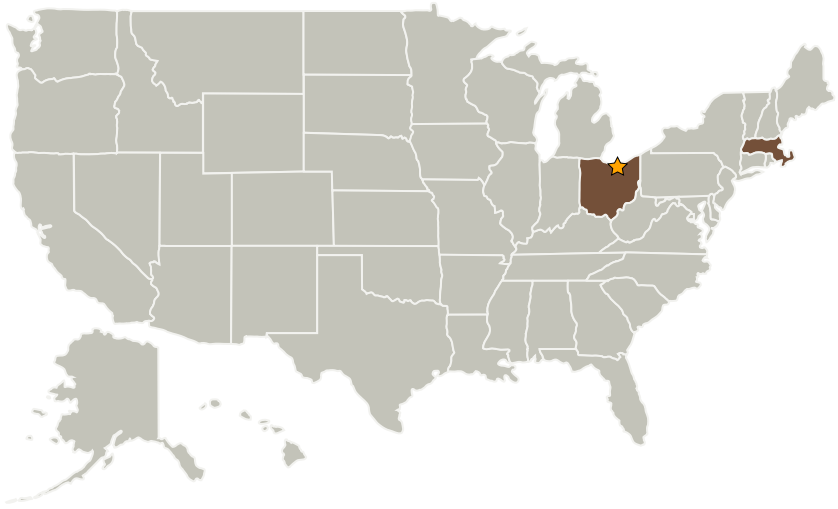
Silicon Whisker and Carbon Nanofiber Composite Anode, Phase I

Completed Technology Project (2009 - 2009)

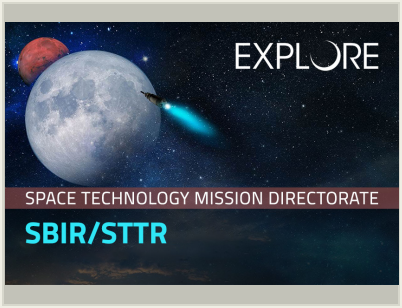
Project Introduction

Physical Sciences Inc. (PSI) proposes to develop a silicon whisker and carbon nanofiber composite anode for lithium ion batteries on a Phase I program. This anode provides high capacity, high power, and improved cycle life at a competitive cost. Silicon is low cost and has a theoretical capacity of 4200 mAh/g but it has a limited cycle life. The nanocomposite design provides a synergistic improvement in reversible capacity and electrochemical cycling as a result of the unique silicon architecture and structural reinforcement provided by the nanofibers. In the Phase I program, PSI will demonstrate a technology readiness level of 3 with an anode capacity of greater than 1000 mAh/g for over 100 cycles (100% depth-of-discharge) using 2 mAh cells. These performance goals will result in an overall battery energy density of greater than 300 Wh/kg. In the Phase II program, PSI will increase cell size to 2500 mAh and optimize cell design to further improve cycle life.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Physical Sciences, Inc.	Supporting Organization	Industry	Andover, Massachusetts



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations	
Massachusetts	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.6 Materials for Electrical Power Generation, Energy Storage, Power Distribution and Electrical Machines